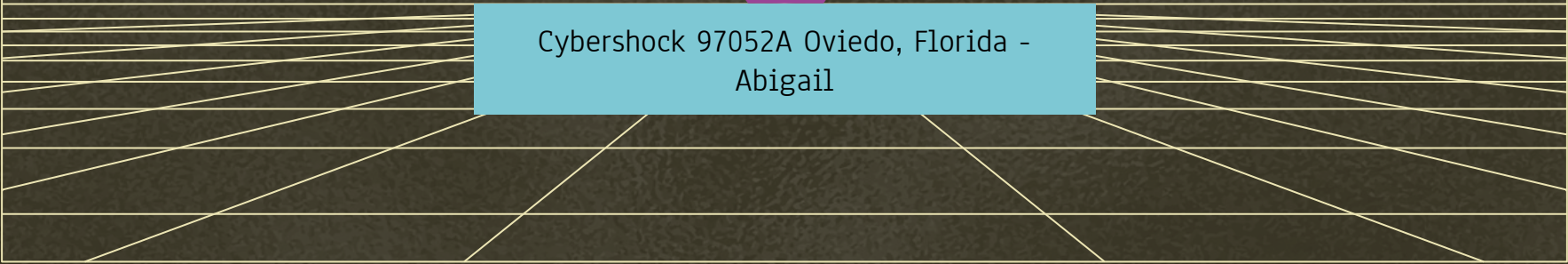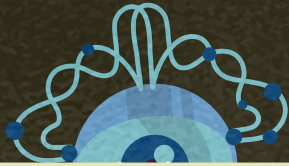# Autonomous is the Future

Cybershock 97052A Oviedo, Florida - Abigail

Why autonomous?

I have always been interested in coding, as far back as I can remember. I first discovered this interest from watching my dad work in his lab at UCF, where he was programming an algorithm for a robotic arm. Later on, when I entered VEX robotics and became the lead programmer, I discovered how difficult it was to program, especially the autonomous section. These events fostered my interest in the future of coding, and how far we can go with making machines as reactive and creative at problem-solving as humans, rather than painstakingly coding step-by-step instructions. Through this simplistic coding, I believe that I can see its potential for the future, when we will be able to code AI and then have machines moving and learning all on their own.
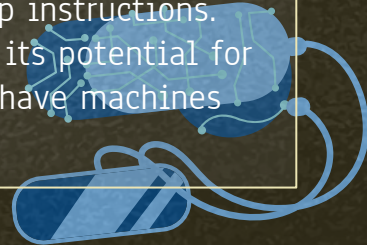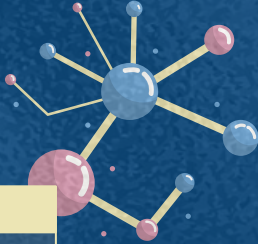
Example

```
//This program assumes the intake begins up and ready to outtake ball in goal
void robotMoveForwardXTurns(int x)
{

    leftMotor1.setVelocity(50, percent);
    leftMotor2.setVelocity(50, percent);
    rightMotor1.setVelocity(50, percent);
    rightMotor2.setVelocity(50, percent);

    //Spin forward all motors
    leftMotor1.spin(forward);
    leftMotor2.spin(forward);
    rightMotor1.spin(forward);
    rightMotor2.spinFor(forward, x, turns);
    //Stop all Motors
    leftMotor1.stop();
    leftMotor2.stop();
    rightMotor1.stop();
    rightMotor2.stop();

}
```

This is an example of part of an autonomous I have recently coded. Its purpose is that it moves the robot forward however many turns of the wheel I decide, based on the method. As you can see however, I had to code each of the steps individually and repeat them, which is why I made this code into a method so I wouldn't have to repeat the lines every time.

Machine Learning Engineer

Based upon my interests, I selected the STEM career "Machine Learning Engineer". Machine Learning Engineers design and develop systems which facilitate "deep learning" and other forms of machine learning. In other words, they code artificial intelligences. This is a challenging career which requires at least a masters, and sometimes even a Ph.D in Computer Science related fields. A Machine Learning Engineer's salary on average is $131,001 per year.

Deep Learning is a form of machine learning, where the machine gains and processes large amounts of data, which it then uses to form connections and identify relationships between the data elements. Then, these relationships can be used to form predictions from complex data which humans may not even be able to process on their own.
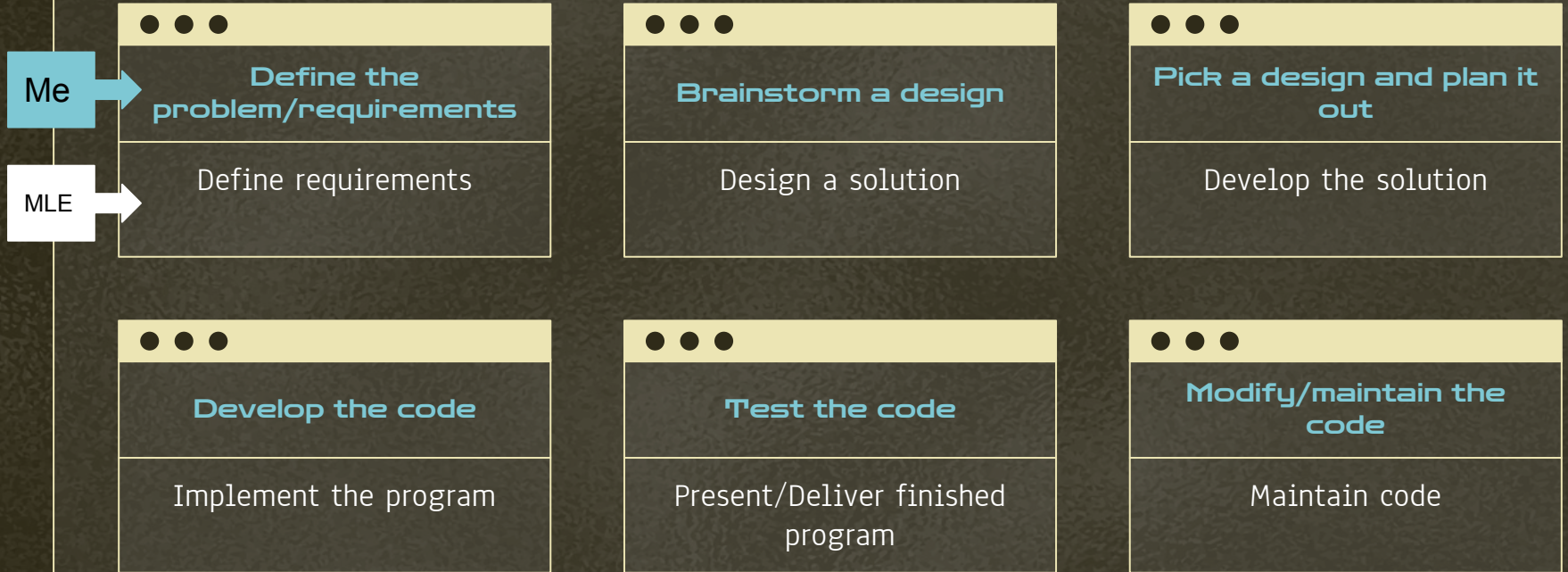
What is Deep Learning?
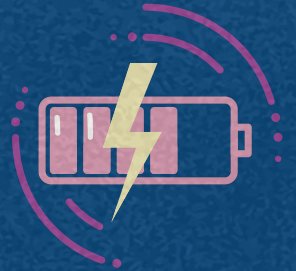
To learn more...

… I consulted my father, who has studies in the fields of deep learning and artificial intelligences. He was able to show me some of his work. He was able to help me understand the engineering process of creating artificial intelligence software, and help me to understand his work.

How do **Machine Learning Engineers** apply steps of the Engineering Design Process compared to **me?**

Me

MLE

Define the problem/requirements	Brainstorm a design	Pick a design and plan it out
Define requirements	Design a solution	Develop the solution

| Develop the code	Test the code	Modify/maintain the code
Implement the program	Present/Deliver finished program	Maintain code

So how does VEX robotics prepare you for becoming a Machine Learning Engineer?

Learning software in order to code the VEX robot gives you experience in creating code and maintaining it according to specifications depending on your robot. Especially in coding the autonomous, I needed to think about which functions I would order my robot to perform exactly, and which I would use sensors to help it gain precision in its function. I had to employ the engineering process, in order to succeed in creating complex and well-functioning programs. This helped me develop creative problem-solving skills, as well as simply learning coding. In addition, seeing your robot run on your own code encourages your passion and excitement for the field. In addition, being in a team forced me to learn teamwork, which is essential when you have any career, but especially in the one which I have chosen, because in such a new and growing field AI creators often need to come together and compile their ideas/progress.

Thank you!
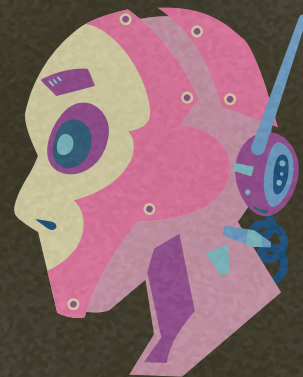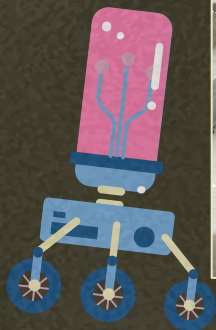
Sources

"Machine Learning Engineer Job Description." Recruiting Resources: How to Recruit and Hire Better, 3 Feb. 2020,
       https://resources.workable.com/machine-learning-engineer-job-description.

Mitchell, Tom M. "Machine Learning." Amazon, McGraw Hill, 2017,
       https://aws.amazon.com/machine-learning/what-is-ai/.

Brown, Sara. "Machine Learning, Explained." MIT Sloan, 21 Apr. 2021,
       https://mitsloan.mit.edu/ideas-made-to-matter/machine-learning-explained.

Su1, Jing, et al. "IOPscience." Journal of Physics: Conference Series, IOP Publishing, 1 May 2020,
       https://iopscience.iop.org/article/10.1088/1742-6596/1544/1/012028.